Do Perceptions Matter Regarding the Costs and Benefits of a Post-Secondary Education?

A summary report of the research program
Development of Measures of Perceived Returns on Investment from Post-Secondary Education

May 2008
Acumen Research Group

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Do Perceptions Matter Regarding the Costs and Benefits of a Post-Secondary Education?

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*Development of Measures of Perceived Returns on Investment from Post-Secondary Education*

Prepared by:
Acumen Research Group

The Canada Millennium Scholarship Foundation

May 2008
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Over the years, many investigators have examined the real return on investment associated with post-secondary education (PSE). This body of work has generally found the economic return to be high. There are also a number of studies, not to mention anecdotal evidence, which suggest that most people believe PSE is good both for the individual and for society at large. Even so, PSE participation rates vary widely across the country and across various subpopulations (e.g., income groups, men and women, Canada's various ethnic groups).

This apparent contradiction led us to wonder how youth conceptualize the value of PSE. Are there individual and group differences in the perceived benefits and costs? Do some place more emphasis on benefits and others on costs? What is the exact nature of the perceived benefits and what types of costs do people perceive? Do people make carefully reasoned calculations, or are their decisions made mostly through an emotionally driven, unconscious process?

While there are studies that have looked at some of the above questions, there is little in the way of theorizing about and no evidence at all of theory-driven attempts to measure the “Perceived Return on Investment in PSE” (PRoI-PSE). We reasoned that if we could develop a reliable measure of PRoI-PSE, we would have the means to empirically examine differences in PRoI-PSE among subpopulations and over time. This in turn would allow us to better understand the PRoI-PSE construct and, ultimately, to help develop policy and target interventions.

The Canada Millennium Scholarship Foundation

The Canada Millennium Scholarship Foundation is a private, independent organization created by the Government of Canada in 1998. The Foundation distributes some $340 million each year to post-secondary students in the form of bursaries and scholarships throughout Canada. Its Research Program advances the study of barriers to PSE and the impact of policies and programs designed to alleviate them. It ensures that policy-making and public discussion about opportunities in higher education in Canada can be informed by rigorous analysis and empirical evidence. The Foundation recognized the potential value of a tool for measuring PRoI-PSE and supported the full research program reported here.

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Canada currently boasts the status of world leader in participation in post-secondary education (PSE). This is a laudable achievement; however, despite decades of policy efforts, there is still evidence that equal access to PSE is a problem, with some groups participating less than others. Young people whose parents have low levels of educational attainment or income are still less likely to enrol and also less likely to persist if they do enrol. In addition, problems of access and persistence have been found among some ethnic groups, including Aboriginal youth.

A consensus is emerging with regard to the issue of unequal participation: it is not simply a matter of financial barriers. Funding opportunities that have been made available to disadvantaged students, such as the bursaries and awards provided by the Canada Millennium Scholarship Foundation, have reduced some barriers but others remain. Moreover, it seems that certain impediments are rooted in individuals’ perceptions of the costs and benefits associated with post-secondary participation.

This research program was built around the concept of “perceived return on investment in PSE” (PRoI-PSE or, more succinctly, PRoI). The PRoI concept involves the notion that people weigh the potential short- and long-term costs and benefits when deciding to pursue or persist with PSE, but they do so in different ways. Individual decisions involve differing degrees of conscious and unconscious calculations, which are based on information of varying accuracy. For example, previous research has shown that many people have serious misperceptions regarding the costs (overestimations) and benefits (underestimations) associated with PSE. These misperceptions have been found to be more pronounced among people from lower socio-economic backgrounds.

Building on previous work published by the Foundation, we here propose a “perceptual horizon effect” to explain the origin and dynamics of some of the misperceptions about PSE. This issue is particularly relevant to youth whose parents have low levels of educational and occupational attainment. In addition to having narrower “horizons for action” regarding their potential future careers, children raised in these environments are hypothesized to be more likely to experience “identity anxiety,” resulting in an attitude set that can impede their ability to accumulate and accurately process information about PSE. This problem of identity can make it difficult for young people to develop a viable academic self-concept and thus prevent them from reaching higher levels of academic performance. Consequently, they would be less likely to receive encouraging feedback concerning their academic potential for PSE. By theorizing the social and psychological mechanisms that perpetuate advantage and disadvantage, this hypothesis takes us beyond the notion that parents’ level of education is the prime factor determining PSE participation.

The research program involved five components that addressed two key questions: (a) can PRoI be reliably and validly measured among various populations, and (b) are these perceptions of costs and benefits predictive of actual PSE attendance?

The results of the program indicate that the concept of PRoI can be reliably and validly measured and that it is predictive of university attendance (but not overall PSE enrolment), net of factors like gender, first-generation student status, grades, encouragement to attend and knowledge of funding opportunities.

Executive Summary

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I.1 Context and Issues

Canada is currently a world leader in terms of participation rates in post-secondary education (PSE): among 25 to 34 year olds, 28% had university-level qualifications in 2000 and an additional 21% had community college diplomas (Statistics Canada, 2003). These high rates were achieved in the 1990s, with trade, college, and university credentials increasing by 39% among those aged 25 and over; this segment of the general population grew by only 14% during that time. University graduates accounted for most of the increase (1.4 million of the 2.7 million PSE graduates), followed by college graduates (1 million) and those in the trades (300,000) (Statistics Canada, 2003).

Post-secondary growth was dramatic in the 1990s, and there is little sign of abatement. Several years ago, it was predicted that PSE enrolment would see increases of around 20% or 30% by 2011, especially in universities (Association of Universities and Colleges in Canada, 2002). However, this estimate will likely prove to be too low, given the fact that we have recently seen six consecutive years of record growth in university enrolment. Between 1998 and 2004 alone, university enrolment increased by 20%, such that there are currently about 1 million full- and part-time university students in Canada (Statistics Canada, The Daily, October 11, 2005).

In spite of this tremendous growth, however, there are persisting concerns regarding how to motivate talented and deserving secondary school students from disadvantaged backgrounds to undertake PSE (Junor and Usher, 2004; Berger, Motte and Parkin, 2007). Not only will a better-educated labour force increase the vitality of the economy and the civic fabric of society, but graduates also derive both direct and indirect benefits from advanced skills development (Schuller et al., 2004).

I.2 The Concept of Perceived Return on Investment (PRoI)

The specific economic benefits, as well as the wider non-economic benefits, of a higher education are now widely recognized by policy makers and increasingly by the general public (e.g., Baum and Payea, 2004; Institute for Higher Education Policy, 2005; Junor and Usher, 2002, 2004; Schuller et al., 2004). Lifetime earnings advantages of a university degree compared to a high school diploma appear to average approximately $1,000,000 in Canada (Côté and Allahar, 2006). This figure is comparable to other countries, such as the U.S. (e.g., Baum and Payea, 2004). In fact, the financial benefit to PSE graduates in terms of rates of return on their investment outpaces other forms of investment, such as equities (HRDC, 2000; Junor and Usher, 2004).

Estimates for personal rates of return on an undergraduate degree compared to a high school diploma vary slightly in terms of how they are calculated (Cohn and Addison, 1998) but are now considered to be at least 10%, with estimates in some countries topping 30%. Recent estimates for Canada put the private annual rate of return at 15% to 28% for community college graduates and 12% to 20% for university graduates (Junor and Usher, 2004; Boothby and Rowe, 2002).

While there may be a realistic awareness of the return on investment from PSE among certain segments of the population, there are questions about the accuracy of awareness among the population that makes up the bulk of people considering PSE—namely, youth, especially high school students (Canada Millennium Scholarship Foundation, 2006). For example, Junor and Usher (2004) and Usher (2005) report that most people overestimate the short-term costs of university in relation to the long-term benefits by a factor of five.
Those from lower-income families have the most serious misperceptions, to the point that they typically think the costs outweigh the benefits. Not only do low-income Canadians think that tuition is higher than it actually is, but they grossly underestimate how much more university graduates make in comparison to high school graduates. Accordingly, these investigators conclude that most people’s ability to make accurate decisions is hampered by faulty information and therefore their rational basis for weighing costs and benefits is undermined. If this is the case, interventions could correct misperceptions and increase post-secondary enrolments, especially among under-represented populations.

Less is known about perceptions of the non-monetary benefits and costs of PSE among youth. There seems to be increasing evidence that those from disadvantaged backgrounds may not be attending PSE institutions primarily because of non-monetary reasons rather than financial concerns—in particular, issues of identity and the tensions and conflicts associated with identity change and dislocation from familiar comfort zones. For example, Malatest and Associates (2004) found that “personal reasons” are more responsible for Aboriginal youth dropping out of university than all other factors (p. 16). It is thus plausible that issues of identity and associated motivations might be more important than perceptions of cost barriers. This research program was inspired by the recognition of an urgent need for further study regarding how prospective students perceive various non-monetary costs of PSE in relation to other costs and benefits.

An examination of two types of disadvantage illustrates the need for additional research: low family income and low parental educational attainment.

In spite of reform attempts, PSE participation is still affected by family income. Low-income young people have been historically under-represented, a situation that has only recently improved somewhat (Junor and Usher, 2004). According to Zhao and de Broucker (2001), children from high-income families are 2.5 times more likely to participate in university than are those from low-income families. However, a recent narrowing of the gap in the late 1990s saw the participation rate of those in the lowest income quartile rising to 19% (vs. 40% for those in the highest quartile), up from 10% in the early 1980s (Corak and Zhao, 2003).

With regard to parents’ educational attainment, young Canadians whose parents went to university are twice as likely as those whose parents simply completed high school and three to four times as likely as those whose parents did not complete high school to attend university (Finnie, Lascelles and Sweetman, 2005; the figures are controlled for other factors like parental and student attitudes toward education and urban vs. rural residence).

Looker and Lowe (2001, p. 25) address this issue, with a conclusion that points directly to the need for research on the PRoI-PSE:

Much of the discussion on the impact of financing on student plans is covered in the research on the effects of family income. However, there is growing Canadian evidence that the perceived cost of post-secondary education is a barrier for high school students from lower [socio-economic status] families ... although several other researchers ... argue that perceived costs do not act as a deterrent to post-secondary plans. For Canada, a comparison of perceived and actual costs would be useful information for both policy makers and students making educational plans.

This raises the larger question about the role of perceptions in educational and career decision-making. Whether accurate or not, perceptions do influence decision-making. Thus, if a high school student, and her/his parents, believe that the cost of post-secondary education is beyond their means, or have incomplete information on the rates of return to specific post-secondary programs, this misinformation gets built into their decision-making. (emphases in original)
In short, a review of the existing research leads directly to the question of whether and how much perceptions of the monetary and non-monetary costs and benefits of PSE actually predict whether someone will enrol in a PSE program and persist once there. An important empirical question driving this research program, then, was the following: “does perceived return of investment (PRoI) from PSE influence behaviour?”

**I.3 The Potential Benefits and Uses of PRoI Measurement**

The ability to accurately measure an individual’s sense of the benefits of PSE in relation to its costs has numerous practical uses. With the ability to measure levels of PRoI, we can examine its correlates as a step toward better understanding how to effectively increase accessibility for the most qualified and interested students, especially among those from backgrounds where PSE participation is historically low. As the report will show, the research program has established that PRoI levels vary as a function of ethnicity, gender, and parental education; with the benchmarks and norms established, we are now in a position to observe trends over time, which will help us understand the impact of various economic and educational policies on PRoI.

The PRoI instrument thus promises to be useful in longitudinal studies that track students from pre-PSE perceptions, through PSE attendance, and into the labour force. Such studies can examine whether various targeted interventions have an impact on PRoI and subsequent educational attainment. We can also examine whether changes in levels of awareness associated with student loans and scholarships influence an individual’s or population’s level of PRoI. In effect, we have a tool to help us assess the impact of policies, programs and services aimed at promoting greater PSE participation (cf. Institute for Higher Education Policy, 2003).

**I.4 The Perceptual Horizon Effect: A Synthesis of Theories**

The theoretical perspective governing this research program evolved over the course of the five fieldwork components. Because no published research had directly conceptualized and measured the notion of Perceived Return on Investment from PSE, the starting point was to combine several theoretical perspectives. The first step was to combine a social-psychological theory from the literature on student development—i.e., the Integrated Paradigm of Student Development (Côté and Levine, 1997, 2000)—and sociological research related to the role of higher education in identity formation—i.e., the Identity Capital Model (Côté, 1997, 2002).

The Integrated Paradigm of Student Development identifies five key motivations young people can adopt for attending universities. Three motivations are thought to “pull” students into attendance: careerism, humanitarianism and personal/intellectual curiosity. The two others, it is posited, “push” them into attending: expectations from others (family members and friends) and PSE attendance as a default option.

The Identity Capital Model identifies “personal agency” as a key factor in explaining how young people can actively negotiate their way through the transition to adulthood, especially the education-to-work transition. Personal agency is operationalized in this model in terms of four inter-related personality strengths: self-esteem, purpose in life, internal locus of control and self-efficacy.

The Integrated Paradigm of Student Development proposes that positive outcomes are predicted by a good fit between the motivations students have for undertaking PSE and the learning environments they encounter there. The Identity Capital Model adds the notion of individual differences in personal agency; this helps to account for how people can potentially influence the likelihood of fitting in well in various contexts by being active participants in their own identity development.
These theories were developed to explain how students already enrolled in university conceptualize their motivations for undertaking courses of action that are logical extensions of decisions made before enrolling. However, the problem at hand in our research program involves “unselected” high school students’ conceptions of a major life transition for which they may or may not have made previous decisions. Accordingly, we integrated the notions of “horizon” from Junor and Usher (2004) and “horizons for action” from Hodkinson, Sparkes and Hodkinson (1996) with the two aforementioned theoretical perspectives to develop the hypothesis of the “perceptual horizon effect.”

This model predicts that prior experiences will broaden or narrow the future horizon that individuals perceive for themselves. This horizon is anchored in the subjective realm of identity, which is affected by (a) the feedback received from the objective realm, such as encouragement from others to think in broad terms beyond current comfort zones, and (b) reinforcements regarding ability levels compatible with broader horizons. For example, if students experience higher levels of academic success—especially if the success is unexpected, given their family background—and are encouraged to engage themselves more deeply in their studies, as their academic achievements increase, they will begin to think of themselves in a different light. They will possibly think of a broader set of “audiences” where these academic achievements will be further rewarded, such as universities. More generally, this type of transformation has been referred to as the “Pygmalion effect” and has been found in classroom settings (Rosenthal and Jacobson, 1968).

High school students are particularly susceptible to the perceptual horizon effect. They are believed by psychologists to be experiencing the identity stage, in which budding identities are formed on the basis of myriad factors, including how they are treated and labelled by their teachers. They are thus vulnerable to the impressions others have of them, but this vulnerability can be the key to subsequent positive development, including the development of a positive academic self-concept. At a deeper level, the formation of a sense of identity involves fundamental, and often unconscious, perceptions of “who one is” in relation to others in society, and these perceptions are strongly influenced by status hierarchies associated with educational credentials in contemporary society. Consequently, all young people will hold conscious or unconscious perceptions of whether they are “university material” or whether they belong elsewhere.

Our model predicts that those who have lower levels of PSE identity anxiety (one of the non-monetary costs of entering PSE) will be more likely to accurately assess the monetary costs of PSE and hold more optimistic views about the monetary and non-monetary benefits. They are more likely to feel that PSE would be in their own interest in the long run, in spite of difficulties that might be experienced along the way. These individuals, who have a relatively broad perceptual horizon, would tend toward an approach predisposition to PSE. However, for those with higher levels of identity anxiety, this subjective experience can constitute an avoidance predisposition that creates a domino effect in terms of misperceptions of overall costs and benefits, thereby maintaining a narrow horizon. Between these two extremes of avoidance and approach dispositions, individuals experience certain approach-avoidance conflicts or, more simply, pushes and pulls regarding post-secondary participation.

Those who have higher levels of identity anxiety about PSE are thought to be less likely to experience a good fit between their school context and their academic self-concept. Without a good fit, they are less likely to develop the types of motivations and personal agency necessary for the levels of academic engagement and grade attainment associated with PSE. The narrow horizons for action characterizing some students can be the result of an absence of positive educational role models (e.g., they do not have parents with PSE), the feeling that they do not belong because of family background or cultural heritage (e.g., their parents are poor or they are Aboriginal) or factors that would lead students to view education solely in terms of extrinsic, forced-choice factors (e.g., the repeated experience of receiving low grades and/or not deriving an intrinsic satisfaction from
learning; the feeling that they are in school only because it is compulsory). As Hodkinson, Sparkes and Hodkinson (1996, p. 3) explain in defining their concept of horizons for action, “perceptions are rooted in the identity of the young person. This, in turn, is strongly influenced by their life histories, the interactions they have with significant others, their experiences and [their] social and cultural background.”

I.5 Research Questions

This research program set out to answer two general research questions: (1) can PRoI-PSE be reliably and validly measured, and (2) do the conscious expectations represented by PRoI-PSE predict future behaviours, net of structural factors (e.g., family background, gender) and personal factors (e.g., good grades, higher levels of academic engagement, encouragement to pursue PSE).
II. Methodologies

II.1 Components of the Research Program

The research program comprised five studies or fieldwork components:

Fieldwork Component 1 (FC1)—Concept Refinement

The first component involved the testing and refinement of the preliminary concepts believed to be associated with PRoI. A sample of 40 respondents completed a battery of instruments online, including a large number of items generated to represent PRoI, and then participated in one of two debriefing focus groups in early August 2005. This approach enabled us to gather useful feedback about the instruments and also to explore their perceptions of return on investments directly through a series of probing questions. On the basis of these procedures, 48 potential items were generated to assess the four factors believed to represent the PRoI construct.

The first report (Acumen Research Group Inc., August 30, 2005) concluded that it was feasible to undertake a multifaceted investigation of this construct to help us better understand the nature of the construct itself, as well as to identify segments of the population that could benefit from intervention efforts that give people a better sense of the relative costs and benefits of PSE.

Fieldwork Component 2 (FC2)—Instrument Development

The second fieldwork component (Acumen Research Group Inc., October 31, 2005), carried out in August 2005, involved the first mass administration of the PRoI instrument to a sample of 704 respondents who had applied to college or university that year. A series of demographic questions and measures to assess the validity of the instrument were also included.

The large sample in this component enabled us to conduct item analyses (factor analysis and estimates of internal consistency reliability) that reduced the 48 items to the 16 that now make up the PRoI16. This included the development of an ancillary instrument with items that do not quite assess PRoI but instead represent hesitancies about participating in PSE, either temporarily or permanently (i.e., Reservations about Post-Secondary Education or RAPSE). Results from this component allowed us to begin the assessment of different forms of instrument validity—that is, how well the empirical measure operationalizes the underlying construct of perceived return on investment from PSE.

Fieldwork Component 3 (FC3)—PRoI among the General Population

The third fieldwork component (Acumen Research Group Inc., December 15, 2005), administered a version of the PRoI16 specifically designed for the general population (called the PRoIGEN, with the same items as the student version when appropriate and more general items when necessary). A total of 1,025 respondents completed the survey in telephone interviews conducted in late October and early November 2005. Of these respondents, 171 also completed the identical set of questions online, and an additional 30 completed the online version only. All teenaged and adult age groups were included, with the median age of the sample being 45.

Fieldwork Component 4 (FC4)—Grade 12 High School Students (T1)

This component produced normative data on the target population for follow-up with the PRoI16 and ancillary measures (RAPSE), enabling us to develop scale norms for this population and several key demographic groups (Acumen Research Group Inc., August 31, 2006). A total of 999 telephone interviews were completed with Grade 12 students in London, Ontario; 562 of these respondents completed additional questions online. A sample of 978 usable cases was obtained for most instruments.
Fieldwork Component 5 (FC5)—Follow-Up of FC4 High School Students (T2)

The final component enabled us to verify if there is a relationship between PRoI levels and the decision to apply to PSE (Acumen Research Group Inc., November 30, 2006). This was accomplished by surveying the original FC4 high school student sample to establish whether they had enrolled in any PSE institutions. We also readministered the PRoI16 to determine if PRoI levels had changed. This follow-up component provided us with a valuable opportunity to examine another form of validity (predictive validity) and reliability (test-retest reliability).

In October and November 2006, 711 respondents (72.7% of the original FC4 sample) were successfully recontacted by telephone, either directly or indirectly. Directly, 496 (49.7% of the original sample) were interviewed by telephone to complete a short survey establishing their current education and work status and complete the PRoI16 and RAPSE measures again. Indirectly, information on the current school and employment status of 215 respondents was obtained through their parents or family members.

II.2 Procedures Employed in the Fieldwork Components

II.2.1 Focus Groups

Focus groups were employed in the FC1 component. This qualitative method enabled us to gather useful feedback about the instruments and to explore young people’s perceptions of return on investments. The 40 respondents who participated in the focus groups first completed the FC2 battery of instruments online, then participated in one of two debriefing focus groups.

II.2.2 Telephone Surveys

Telephone surveys were used in components FC3 through FC5. The Acumen Research Group call centre carried out these surveys, with responses coded into the proprietary Survey Management System™ developed by Acumen Research Group. In some instances, respondents were directed to websites to complete portions of the survey online.

II.2.3 Online Surveys

Respondents were directed to websites whenever possible as a way of reducing costs, with FC2 carried out exclusively online. In FC3, a subsample was asked to complete the same questions both by telephone and online. Results indicate that the two methods of administration are highly comparable, with correlations in the magnitude of .75 for scale scores. Moreover, the online version of the PRoI16 had essentially the same factor structure as the telephone version and showed corresponding levels of reliability. However, the reliability coefficients for the online administration were somewhat higher than for the telephone administration, which may reflect the fact that online respondents have more time to reflect on the item content, as opposed to feeling time pressure during a telephone interview.

II.2.4 Sample Recruitment

Samples for FC1 and FC2 were drawn as convenience samples from those who had participated in the 2005 College Applicant Survey and the 2005 University Applicant Survey and had indicated a willingness to participate in further online surveys.

The Acumen Call Centre drew the FC3 sample on the basis of a random dialing of households across Canada. Acumen Research Group interviewers collected and coded responses using the proprietary Survey Management System™.

The sample required for the final two fieldwork components presented special problems because the target population was those in their final year of high school, for whom no lists are available and for whom random dialing would be highly inefficient given the low probability of finding a Grade 12 student in a randomly selected household. Accordingly, FC4 respondents were solicited through their schools in the Thames Valley School District in London, Ontario, where the study was explained to students in their homerooms (i.e., the classrooms where they begin their school days) by a representative of Acumen. Interested students were given stock cards providing information
about the study. Those students interested in participating provided a contact phone number.

Of those subsequently contacted by telephone, a number gave the interviewer an e-mail address to which the link for the online component of the survey could be sent. FC4 respondents were recontacted by telephone for FC5 (T2) follow-up.

II.3 Validation of the PRoI-PSE Instrument

II.3.1 Construct Validation

To direct the assessment of validity, three questions were asked:

1. Does the PRoI scale demonstrate the hypothesized multidimensionality?

The general answer to this question is a qualified yes. It was originally postulated that PRoI16 would comprise four factors: two representing benefits (monetary and non-monetary) and two representing costs (again, monetary and non-monetary). Factor analysis at the FC2 stage confirmed that these four factors were robust, leading us to assume that other population segments would also distinguish them in this fashion. However, the FC2 sample of college-or university-bound young people were slightly older than the cohorts that go directly from high school to PSE, so it was important to check their results against the younger FC4 cohort.

Results for the FC4 sample (at T1, while in Grade 12) indicated that the eight benefits-items formed one factor—the first and strongest one—instead of the two hypothesized. (It was also the case that these two factors were not differentiated in the FC3 study, which surveyed the general public.) The FC4 sample of Grade 12 students was younger and more diverse than those in FC2, in that they may not yet have applied for PSE acceptance, were undecided about what to do, or had decided against undertaking PSE. Accordingly, the attitudes held by these Grade 12 students may not be as differentiated or complex as those of the older, more experienced students in the FC2 sample, who were on the cusp of PSE participation. At the same time, it must be noted that the factor structure changed for the Grade 12 students at follow-up (T2), more or less returning to the four-factor structure found for the FC2 sample; perhaps they had gained more experience with the educational system by that point. The factor solution for the FC5/T2 sample is presented in Table 1.

To sum up, the various factor analyses carried out on the diverse samples have led us to conclude that the factor structure of the perception of benefits is not invariant across samples, although the perception of costs appears to be invariant. We hypothesize that those with more direct experience with PSE, especially university, are more likely to separate monetary and non-monetary benefits in their perceptual schemas about the benefits of a PSE, while those who have not given it as much thought are less likely to do so. Factors that would influence someone to give more thought to the differences between monetary and non-monetary benefits might include having role models with PSE whose work context does not match his/her credentials (e.g., good working conditions but low pay, high pay but stressful working conditions). This is a matter that needs to be unpacked in future research.

Table 1 provides the exact wording of the items and presents the results of the factor analysis for the final sample of the research program, with the scales presented in the columns in order of eigenvalue magnitude. With respect to the issue of the factor structure of the PRoI16, it can be seen that two of the four non-monetary benefits items load onto the monetary benefits scale, with one of those two loading on both factors. This does not present a problem in the use of the scales, because for practical purposes we simply combined the hypothesized factors in calculating the subscales of the PRoI16. The issue of the four-factor structure of the PRoI16 is thus somewhat academic, because it is more expedient to simply report “total benefits” and “total costs”—both of which have adequate reliability (BENTOT – Cronbach’s alpha = .81; COSTTOT – alpha = .75)—and to use their subscales only when it is of interest to “drill down” into the data. All four subscales have adequate reliability, as shown in Table 1. Moreover, it is even more expedient to simply report the total of the PRoI16, which subtracts total costs from total benefits, thereby distilling all of the information into one variable.
2. Is the PRoI scale correlated with measures of similar constructs (the validation measures)?

The answer to this question is also “yes.” Two validated scales were used to assess the validity of the PRoI measure. One is a measure of personal agency that was initially derived from a bank of 14 of the most commonly used personality measures associated with effective identity formation among university students. The Multi-Measure Agentic Personality Scale (MAPS20—Côté, 1996) is made up of 20 items distributed into four subscales: self-esteem, purpose in life, internal locus of control and self-efficacy. These items are summed to produce one score.

The second validation scale, the Student Motivations for Attending University (SMAU20), was extensively developed among university students through a series of studies using factor analytic techniques, yielding reliable and valid measures of five of the key motivations young people adopt for attending universities:

Table 1 — Factor Analysis on the T2 (FC5) Sample: Items, Diagnostics, and Factor Loadings

<table>
<thead>
<tr>
<th>Items</th>
<th>Monetary benefits</th>
<th>Identity anxiety</th>
<th>Debt aversion</th>
<th>Non-monetary benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>People who get a PSE will make more money over their lifetime than those who just get a high school education.</td>
<td>.795</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Although a PSE can be costly, I believe that I would make more money in the long run.</td>
<td>.683</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think that if I were to put the time and effort into getting a good PSE, I would make a lot more money in the long run.</td>
<td>.660</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The best way to get a prestigious job is through a PSE.</td>
<td>.651*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident that a PSE would lead me to a better paying job.</td>
<td>.554</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I'm hesitant to pursue a PSE because it would create tensions with the people I grew up with.</td>
<td>.798</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I were to pursue a PSE, my friends would think that I'm trying to be better than them.</td>
<td>.742</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I pursued a PSE, I'm afraid that it would confuse me about “who I am.”</td>
<td>.649</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I'm hesitant to pursue a PSE because it would create tensions between my parents and me.</td>
<td>.624</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The costs of a PSE have become so high that they outweigh any future financial benefits.</td>
<td></td>
<td>.777</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Given the high costs of a PSE and the time it takes to complete it, you are really no further ahead financially than if you get a job right after high school.</td>
<td></td>
<td></td>
<td>.699</td>
<td></td>
</tr>
<tr>
<td>I'm not sure that a PSE would pay off even in the long run, given how costly it is these days.</td>
<td></td>
<td></td>
<td>.673</td>
<td></td>
</tr>
<tr>
<td>I'm hesitant to undertake a PSE because of the amount of debt I'm likely to accumulate by the time I graduate.</td>
<td></td>
<td></td>
<td>.625</td>
<td></td>
</tr>
<tr>
<td>People who have a PSE get jobs that are much more satisfying.</td>
<td></td>
<td>.641</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If you want a rewarding career these days, you need a PSE.</td>
<td>.403*</td>
<td></td>
<td>.632</td>
<td></td>
</tr>
<tr>
<td>Getting a PSE will lead me to find work that I really enjoy doing.</td>
<td></td>
<td></td>
<td>.513</td>
<td></td>
</tr>
</tbody>
</table>

Item values range from 1 to 5; Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; four factors specified; n = 465; rotation converged in six iterations.

* Note: originally designated as non-monetary benefit items.
i.e., the three “pull” motivations (careerist/materialist, humanitarian, personal/intellectual) and two “push” motivations (i.e., expectation driven, default) (Côté and Levine, 1997, 2000).

Table 2 shows the correlations among these scales for the FC2 sample, where it can be seen that both PRoI benefits subscales positively correlate with the three “pull” motivations and at least one “push” motivation from the SMAU20, as well as the measure of personal agency. It should also be noted that the two PRoI costs subscales negatively correlate with the three pull motivations, as well as personal agency. These findings suggest, for example, that those with higher levels of identity anxiety do not experience as much “pull” to engage in PSE and more of a “push” from external factors like parental pressure. They are also less likely to have the attributes that make up personal agency, like higher levels of sense of purpose and self-esteem.

Finally, in the FC2 survey, global measures of benefits versus costs were used to help see how people in different global categories of cost-benefit analysis differ in terms of their endorsement of PRoI scales. Colleges and universities were rated separately. The five categories were: (1) the costs greatly outweigh the benefits, (2) the costs somewhat outweigh the benefits, (3) the benefits cancel out the costs, (4) the benefits somewhat outweigh the costs, and (5) the benefits greatly outweigh the costs. The category contrasts of most interest are 1 versus 5, and category 1 is of particular interest because it reflects a firm decision that PSE is too costly in relation to benefits.

A series of one-way analyses of variance (ANOVA) with additional Student-Newman-Keuls (SNK) post-hoc multiple range tests revealed that on the global items regarding overall monetary benefits, those in category 1 gave significantly lower ratings on the monetary benefits subscale of the PRoI16 and higher ratings on debt aversion for both the university and community college populations. The same pattern was revealed with respect to the global items representing overall non-monetary benefits: those in category 1 gave lower ratings of the non-monetary benefits and higher ratings of identity anxiety.

3. Does the PRoI scale differentiate among subpopulations in expectable ways?

In all fieldwork components, the PRoI16 differentiated among subpopulations in predictable ways, some of which are described below.

II.3.2 Predictive Validity

The PRoI16 was found to be predictive of future PSE involvement. When other factors known to predict PSE attendance are taken into account in multivariate analyses, measures based on the PRoI construct are able to significantly predict who will go on to attend university (see Part V).

Table 2 — Correlations between PRoI16 Subscales and Validation Scales for FC2 Sample

<table>
<thead>
<tr>
<th>PRoI16 Subscales</th>
<th>SMAU20</th>
<th>MAPS20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Careerist</td>
<td>Personal/intellectual</td>
</tr>
<tr>
<td>Monetary benefits</td>
<td>.58</td>
<td>.45</td>
</tr>
<tr>
<td>Non-monetary benefits</td>
<td>.57</td>
<td>.47</td>
</tr>
<tr>
<td>Debt aversion</td>
<td>-.33</td>
<td>-.27</td>
</tr>
<tr>
<td>Identity anxiety</td>
<td>-.26</td>
<td>-.26</td>
</tr>
</tbody>
</table>

Correlations of .09 and above are statistically significant at the .05 level, 2-tailed; n = 564-584.
II.3.3 Summary Score: The PRoI16

The PRoI16 is calculated by subtracting the respondent’s estimate of total costs (COSTTOT, comprising the two subscales “identity anxiety” and “debt aversion”) from total benefits (BENTOT, comprising the two subscales “monetary benefits” and “non-monetary benefits”). Figure 1 shows that the resulting scale for the FC4 sample has a reasonably normal distribution that slightly favours positive attitudes concerning the returns on PSE, as one would expect, given the widely known objective evidence of benefits.

The descriptive statistics for the PRoI16 for the FC4 sample and its two principal subscales, BENTOT and COSTTOT, are provided in Table 3. The coefficients representing skewness and kurtosis generally fall between +1 and -1, so the distributions of these variables are not a problem for statistical analyses. The means for these scales compare favourably with those obtained from the sample in the FC2 phase of the research, which were 17.5, 33.5 and 16.0, respectively. The FC2 sample was only a year older, on average. However, comparing the results with those from the general population provided in the FC3 report reveals rather different perceptions of the relative returns from PSE, with mean scores of 9.6, 30.6 and 21.0, respectively, for the PRoI16, BENTOT and COSTTOT.

Table 3 — Descriptive Statistics for PRoI16, Total Benefits (BENTOT) and Total Costs (COSTTOT) for FC4 Sample

<table>
<thead>
<tr>
<th></th>
<th>PROI16</th>
<th>BENTOT</th>
<th>COSTTOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Valid</td>
<td>918</td>
<td>946</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>60</td>
<td>32</td>
</tr>
<tr>
<td>Mean</td>
<td>17.831</td>
<td>33.208</td>
<td>15.448</td>
</tr>
<tr>
<td>Median</td>
<td>19.000</td>
<td>34.000</td>
<td>15.000</td>
</tr>
<tr>
<td>Std. deviation</td>
<td>7.5210</td>
<td>4.7120</td>
<td>5.0311</td>
</tr>
<tr>
<td>Skewness</td>
<td>-.538</td>
<td>-.889</td>
<td>.950</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-.027</td>
<td>.835</td>
<td>1.059</td>
</tr>
<tr>
<td>Minimum</td>
<td>-8.0</td>
<td>15.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Maximum</td>
<td>32.0</td>
<td>40.0</td>
<td>38.0</td>
</tr>
<tr>
<td>Percentiles</td>
<td>25</td>
<td>13.000</td>
<td>30.000</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>19.000</td>
<td>34.000</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>23.250</td>
<td>37.000</td>
</tr>
</tbody>
</table>
and COSTTOT. These scores from the older general population (aged between 41 and 50, on average) suggest a narrower difference in the estimate of costs and benefits (a 9.6-point difference on the PRoI16 scale vs. a 17- to 18-point difference for the younger sample), a lower estimate of the benefits and a more exaggerated perception of costs. Although the results from the general population are based on a slightly different but compatible set of questions with the same psychometric characteristics, it appears that younger Canadians involved in the educational system are more optimistic regarding the rates of return from PSE than are those older Canadians who are uninvolved or past their involvement with it.

II.3.4 Ancillary Scales

Some of the items dropped from the original item pool used to develop the PRoI16 scale appear to represent additional constructs that are also important in understanding why and whether people undertake PSE. Specifically, “indecision concerns” and “belief in PSE alternatives,” two constructs represented by some of the items dropped from the original pool, were represented in subsequent fieldwork components as four-item scales. Table 4 shows the factor structure of these items for FC2 and FC4. The overall construct will be referred to as “Reservations about PSE” (RAPSE). These scales will be used to complete the “PRoI Profile” and to develop a typology of students’ overall dispositions toward PSE participation.

II.3.5 The Structure of PRoI: Subscales of the PRoI Profile

Table 5 shows the correlations among the PRoI subscales and the RAPSE subscales for FC4 and FC5 (T1 and T2 in the follow-up of the Grade 12 sample) that make up what we call the “PRoI Profile.” This table suggests both an underlying cognitive structure to the PRoI Profile and the stability of this Profile. The Profile is of use because it adds information to the four subscales of the PRoI16. Comparing the RAPSE scales with the PRoI scales also reveals some features supporting the “perceived horizon effect” postulated above. For example, we can see moderate correlations between identity anxiety and both indecision

Table 4 — Items and Factor Loadings for Reservations about PSE (RAPSE) Scales

<table>
<thead>
<tr>
<th>Factor</th>
<th>Indecision concerns</th>
<th>Belief in PSE alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FC2</td>
<td>FC4</td>
</tr>
<tr>
<td><strong>Eigenvalue</strong></td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td><strong>% variance explained</strong></td>
<td>31%</td>
<td>32%</td>
</tr>
<tr>
<td><strong>Cronbach’s alpha</strong></td>
<td>.79</td>
<td>.79</td>
</tr>
<tr>
<td>I’m hesitant to pursue a PSE because I really don’t know what I want to do with my life yet.</td>
<td>.76</td>
<td>.78</td>
</tr>
<tr>
<td>I really haven’t honed down my interests enough to know what to study if I were to go to college or university.</td>
<td>.76</td>
<td>.75</td>
</tr>
<tr>
<td>I don’t feel that I am emotionally prepared to go to college or university yet.</td>
<td>.78</td>
<td>.78</td>
</tr>
<tr>
<td>I don’t think that I have the correct mindset right now to tackle a PSE program.</td>
<td>.81</td>
<td>.75</td>
</tr>
<tr>
<td>I think I could find a rewarding job without a PSE.</td>
<td>.76</td>
<td>.82</td>
</tr>
<tr>
<td>Good jobs can be found without a PSE.</td>
<td>.71</td>
<td>.73</td>
</tr>
<tr>
<td>You can learn enough about the real world without a PSE.</td>
<td>.59</td>
<td>.65</td>
</tr>
<tr>
<td>I don’t think I would ever find fulfilling work if I didn’t get a PSE. (reverse recoded)</td>
<td>.66</td>
<td>.59</td>
</tr>
</tbody>
</table>
concerns and debt aversion, whereas there is only a very low correlation between identity anxiety and belief in PSE alternatives. One interpretation of this pattern is that identity anxiety produces cognitive blocks regarding PSE participation rather than a set of attitudes about alternatives to PSE. This interpretation is also supported by the lower, albeit negative, correlations between identity anxiety and both forms of benefits, suggesting that those with higher identity anxiety have not given the benefits enough thought to form strong opinions about their possible effects.1

It is also useful to examine benchmarks for the three clusters constituting the PRoI Profile established above. These are provided in Figure 2, where the relative ratings for each subscale can be clearly seen in “box-and-whisker plots.”2 Note that all scales have the same possible range of four to 20. It is interesting to observe that among the four scales representing potential drawbacks, belief in PSE alternatives is rated at the highest magnitude and identity anxiety is rated lowest, suggesting that the latter is experienced by a minority of the sample (in fact, 60% of the sample score at “4” on the scale indicating that they are not experiencing it at all). The other two scales, debt aversion and indecision concerns, have comparable rating magnitudes.

Table 5 — Correlations among PROI and RAPSE Scales for the T1 and T2 Samples

<table>
<thead>
<tr>
<th></th>
<th>Monetary benefits</th>
<th>Non-monetary benefits</th>
<th>Non-monetary costs: identity anxiety</th>
<th>Monetary costs: debt aversion</th>
<th>Belief in PSE alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
</tr>
<tr>
<td>Non-monetary benefits</td>
<td></td>
<td></td>
<td>.60</td>
<td>.64</td>
<td></td>
</tr>
<tr>
<td>Identity anxiety</td>
<td>-.15</td>
<td>-.15</td>
<td>-.06</td>
<td>-.10</td>
<td></td>
</tr>
<tr>
<td>Debt aversion</td>
<td>-.26</td>
<td>-.23</td>
<td>-.13</td>
<td>-.19</td>
<td>.45</td>
</tr>
<tr>
<td>Belief in PSE</td>
<td>-.38</td>
<td>-.38</td>
<td>-.52</td>
<td>-.53</td>
<td>.06</td>
</tr>
<tr>
<td>alternatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indecision concerns</td>
<td>-.06</td>
<td>-.18</td>
<td>-.08</td>
<td>-.19</td>
<td>.44</td>
</tr>
</tbody>
</table>

T1 \( n = 953-972; \) T2 \( n = 475-482. \)

Figure 2 — Benchmarks for Total Sample on PRoI Profile for FC4 Sample

1. Further evidence for the role of identity anxiety in the perceived horizon effect can be found in the significant negative correlations between identity anxiety and questions tapping encouragement from others (-.22) and level of educational aspirations (-.27) from the FC4 survey, as well as its negative correlations with personal agency (-.29) and intrinsic motivations for attending PSE (.15 to -.30) from the FC2 study.

2. Box-and-whisker plots show the median or 50th percentile (the line in the centre), the 25th and 75th percentiles (the lower and upper lines of the box, respectively) and the 5th and 95th percentiles (the “whiskers” on the bottom and top of each box plot, respectively).
II.3.6 PROI Clusters: Optimists, Pessimists and Skeptics

Cluster analysis allows us to identify groups of people with similar attitude constellations, in this case on the various dimensions of the PROI16 and RAPSE scales. In the cluster analysis performed on the FC4 data, we used all six scales constituting the PROI16 subscales and RAPSE. The logic for selecting this technique is based in part on the correlational pattern in Table 6 and in part on the possibility that attitudes about benefits and costs might not tell the whole story about who goes on to PSE and why. The RAPSE scales add information concerning influences that compete with the ability of the PROI16 to predict PSE attendance—namely, indecision concerns about attending and belief in PSE alternatives.

Table 6 shows the results of a “k-means cluster analysis” of the six scales. The three-cluster solution was selected because it was the most theoretically interpretable and the categories had reasonably compatible n sizes. Figure 3 presents the three attitude patterns.

The first cluster was named “pessimistic” about PSE because they score the lowest on benefits and highest on belief in PSE alternatives; in fact, their ratings for the viability of PSE alternatives are as great as

<table>
<thead>
<tr>
<th>Sample means</th>
<th>Cluster 1 means</th>
<th>Relative position of cluster 1*</th>
<th>Cluster 2 means</th>
<th>Relative position of cluster 2*</th>
<th>Cluster 3 means</th>
<th>Relative position of cluster 3*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary benefits</td>
<td>17.3</td>
<td>15.4</td>
<td>lo</td>
<td>18.5</td>
<td>hi</td>
<td>17.7</td>
</tr>
<tr>
<td>Non-monetary benefits</td>
<td>15.9</td>
<td>13.3</td>
<td>lo</td>
<td>17.4</td>
<td>hi</td>
<td>16.4</td>
</tr>
<tr>
<td>Identity anxiety</td>
<td>5.9</td>
<td>5.7</td>
<td>mid</td>
<td>4.7</td>
<td>lo</td>
<td>7.7</td>
</tr>
<tr>
<td>Debt aversion</td>
<td>9.6</td>
<td>10.3</td>
<td>mid</td>
<td>7.7</td>
<td>lo</td>
<td>11.5</td>
</tr>
<tr>
<td>Belief in PSE alternatives</td>
<td>12.5</td>
<td>15.5</td>
<td>hi</td>
<td>10.5</td>
<td>lo</td>
<td>12.4</td>
</tr>
<tr>
<td>Indecision concerns</td>
<td>9.6</td>
<td>9.0</td>
<td>mid</td>
<td>6.8</td>
<td>lo</td>
<td>14.3</td>
</tr>
</tbody>
</table>

Ns

* Based on one-way ANOVAs; all clusters are significantly different on the SNK test; discriminant function analysis using the six PROI and RAPSE subscales correctly classified 97.2% of cases “back” into the three clusters.
as their perceptions of potential monetary benefits of PSE. The second cluster was called “optimistic” about PSE because they have the most positive attitudes on all scales, rating the benefits to be highest and the costs and belief in PSE alternatives to be lowest. Finally, the third cluster was called “skeptics” because they score highest on both forms of costs as well as on indecision concerns, middling about belief in PSE alternatives, and relatively low with regard to the benefits.

While one might postulate that cluster membership would be heavily influenced by grade attainment, the relationship is actually not strong. When the clusters are cross-tabulated against grades, optimists are indeed most likely to be A students (just under 48%) and skeptics are most likely to be C students, but almost as many optimists are B students (just under 40%), and 13% are C students. Moreover, a similar distribution of grades was found for pessimists and optimists. In fact, the coefficients of association, including eta, are only about .20. Thus, the clusters are much more informative than simply looking at academic performance.

With this profile of six subscales, we continued our analysis of PRoI with confidence that we have tapped the multidimensionality of the construct and can identify the benchmarks and unique signatures for various subpopulations. This multidimensional profile allows us to provide more extensive information for diagnosing potential difficulties that prospective students might experience as they form their perceptions of PSE, particularly among disadvantaged populations.
Subpopulation Differences: Social Identity

The results of the various studies undertaken to validate the PRoI instrument suggest that perceived return on investment from PSE is related to key background factors like parents’ education (which determines first-generation PSE student status), gender, and visible minority and Aboriginal status. These background factors constitute issues of social identity, by which young people experience different forms of socialization and over time come to define themselves in ways that are affected by these influences.

III.1 First-Generation Students

First-generation students are those who are the first members of their family to pursue PSE. This group is of particular interest, given the emphasis placed on improving both access and retention for low- and middle-income students by the Canadian government and the Foundation (Riddell, 2006).3

III.1.1 Issues Identified in the Literature

Previous research has shown that first-generation students differ in significant ways from those whose parents attended college or university. Work by Acumen’s Academica Group (2005) found that among 2005 university applicants, those applicants with parents who did not have PSE credentials tended to have lower household incomes, lower grade averages and fewer savings for PSE. They were also more likely to continue living at home while at university. First-generation students showed higher levels of concern than other applicants about future debt loads and their financial ability to complete university studies.

Other research has uncovered a variety of risk factors associated with first-generation student status, like lower grade point averages and less integration into student life (Grayson, 1997). Some research has found them to be more likely to drop out, although they are less likely to do so if they have friends who believe in the importance of PSE (Statistics Canada, 2000). First-generation student status also correlates with low socio-economic status, which carries with it a tendency for lower grades, less academic engagement, less involvement in student life and more working for pay while studying. All of these factors in turn lead to lower levels of educational and occupational attainment, including lower salaries in later careers (Walpole, 2003). However, low socio-economic status students who become more heavily involved academically and socially are not as likely to experience these risk factors. Finally, Lehmann (2004) found in a qualitative study that first-generation students were more anxious about their transition to university and believed that it would be uncertain and difficult. They anticipated that they would have a hard time fitting in and felt themselves to be at risk of failing.

Based on the literature, we expected that potential first-generation students would be less likely to pursue PSE and score lower on the PRoI16 because of a lower estimate of benefits and higher estimate of costs. They would also be more likely to have concerns related to indecision and belief in PSE alternatives. We also expected this group to be less likely to be optimists and more likely to be pessimists or skeptics.

3. While one might think that visible minority and Aboriginal students would be more likely to be first-generation PSE students, this was not the case in our Grade 12 student sample. In the case of Aboriginal students, as a group they were statistically more likely to be potential first-generation university students, but of the six who had this potential status, five actually went on to attend university, contrary to the general prediction for first-generation students.
III.1.2 Key Findings

In comparison to students with parents who attended a post-secondary institution, first-generation students (i.e., neither of their parents have any college or university experience), score higher on the following PRoI scales:

- identity anxiety
- indecision concerns
- debt aversion.

They score lower on the following measures:

- overall score on the PRoI16
- the importance their parents place on PSE
- encouragement from others to undertake PSE
- discussions with parents regarding PSE
- money saved for PSE
- knowledge of scholarships and bursaries.

In terms of the PRoI clusters, first-generation students (versus the remainder of the sample) were less likely to be optimists but more likely to be skeptics. They were also more likely to aspire to obtain a community college diploma and less likely to aspire to obtain an undergraduate degree or advanced university degree.

When it came to what they were actually doing by T2 (FC5), first-generation students were more likely to have stayed in high school and less likely to have enrolled in a university. The likelihood of pursuing community college studies did not significantly differ by first-generation status, although the adjusted residual test approached significance.

When first-generation university student status was examined instead of first-generation status for any level of PSE, we similarly found that these students were more likely to enter the labour force (or pursue some other non-post-secondary option) or enrol in a community college, while being less likely to enrol in university.

Due to the concern that the most qualified first-generation students are not reaching their potential in the post-secondary system, several more analyses were undertaken to attempt to identify the sources of their reluctance to attend university. The analyses revealed that the pattern holds true even for first-generation university students at the highest grade level. That is, first-generation A-level students were still less likely to enrol in university and more likely to enrol in community college than were those who had a parent with some university experience. Further analyses revealed that this grade bias held only for females, with first-generation females attaining A or A+ grades being significantly less likely to attend university. It thus appears that a significant percentage of high-achieving potential first-generation university students are not realizing the potential represented by university attendance.

Taken together, these results provide strong support for the “perceived horizon effect”—namely, youth from backgrounds where PSE is not part of their lives as they grow up, especially in terms of parental influence and encouragement, have more limited perceptions of their future educational and occupational horizons. These restrictions appear to be related to an identity anxiety that in some cases creates an inflated estimate of financial costs and greater indecision concerns; this is not counteracted by seeking out information on funding opportunities. Ultimately, this leads them to not pursue PSE at all or pursue lower levels of PSE (college), even though they have the ability to attend university, based on their good high school grades.

III.2 Gender Issues

III.2.1 Issues Identified in the Literature

While males have historically outnumbered females in PSE, over the past few decades females have increasingly attended PSE institutions and have now reached the point where they dominate, especially at the undergraduate level and in certain disciplines at the graduate level. Both male and female rates of participation are increasing, but the female rate has been increasing at a steeper pitch. This is occurring in most countries around the world that have expanded their PSE sector.

The current chief hypothesis for this trend is that the personal rate of return is higher for females than

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4. When first-generation student status is defined in terms of parents’ university education only, a full 62.7% of the sample reported that neither parent had any university experience. When first-generation status is defined in terms of college or university (i.e., PSE in general), only 26.3% of the sample reported that neither parent had any PSE experience.
for males and has been increasing over time, so females have been following the rewards (e.g., Christofides, Hoy and Yang, 2006). This greater valuing of PSE comes out clearly in the findings from our studies in terms of females rating benefits higher than males. However, this explanation does not answer the question of why more males are not also responding to the potential rate of return on PSE, given that there is also a significant disparity in average wages for young men with a high school education and those with PSE credentials. In our findings, it appears that some males may be diverted from PSE due to personal factors such as identity anxiety and indecision concerns, as well as a perception that there are more opportunities for them in the job market without a PSE compared with females.

In the U.S., it has been found that females earn higher grades and are more academically engaged in high school, as well as in university (Lewin, 2006, citing findings from the National Survey on Student Engagement and CIRP studies, both of which involve very large samples surveyed every year). We found these differences in our sample, with Grade 12 females earning grades that are, on average, about one half a letter grade higher than males (a mid-B vs. a high C+, respectively) and putting more effort into their courses (about eight hours per week vs. about five hours per week, respectively).

What we do not know from these data is whether males are opting out of PSE in greater numbers because of the aforementioned personal factors (associated with a narrower perceived horizon) or whether their lower high school grade attainment is discouraging them from applying. According to the Ontario Universities’ Application Centre, in 2005, 58% of applicants to Ontario universities were female and 42% male (Acumen Research Group, February 2006). In 2004-05, Statistics Canada data show that females made up 56.7% of the full-time undergraduate body (CAUT, 2007), so universities are not discriminating against males in terms of admissions. The gender disparity in PSE participation thus appears to be a matter of self-selection. The questions that remain are: what is the basis of this self-selection? And when does it begin? Some evidence exists for these questions. For example, Junor and Usher (2004) show that females tend to decide to pursue PSE slightly earlier than males do and are slightly more likely than males to be encouraged by their parents to do so. It has also been theorized that book learning has been “feminized” after several decades of policy attention to the under-representation of women at higher levels of education. If this is occurring, it may be triggering identity anxiety among some males who identify more with traditional modes of masculinity.

Based on the literature, we would expect that males would score higher in terms of identity anxiety, indecision and belief in PSE alternatives and that they would thus be more likely to be skeptics and less likely to be optimists.

### III.2.2 Key Findings

We found striking, across-the-board differences between males and females in all samples of school-aged young people, with females showing a much more promising PRoI Profile. With the exception of debt aversion, males and females differ on all PRoI indicators: both forms of benefits, identity anxiety, indecision concerns and belief in PSE alternatives. In terms of PRoI clusters, males are more likely than females to be pessimists and less likely to be optimists.

The lack of difference in terms of debt aversion, in conjunction with differences on all other scales, suggests that gender differences in the attitude structure concerning PSE participation are perceptual and personal; they cannot therefore be remedied by simply making PSE more affordable. What needs to be addressed are identity anxiety and indecision concerns. It may be the case for some males that their belief in PSE alternatives has some validity, but very few (about 5%) aspire to the trades, a non-PSE option which would give them some job security and higher incomes.

In terms of what youth are actually doing in the first year after Grade 12, the FC5 study found that males are more likely than females to enter the labour force or to remain in high school and less likely to enrol in university. Only 19% of males had enrolled in university, whereas 44% had remained in high school. In fact, more males (21%) entered the

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5. There were no gender differences in the study of the general population (FC3).
labour force (or did “other” things) than went to university. Conversely, 40% of females went on to university, while only 31% stayed in high school. Almost three times as many females went on to university as entered the labour force. These findings are consistent with the previously discussed changes in the composition of the university student body (i.e., females now outnumber and outperform males at the university level).

**III.3 Visible Minority and Aboriginal Students**

**III.3.1 Issues Identified in the Literature**

Junor and Usher (2004) make the point that including diverse ethnic groups into one category of “visible minorities” may make it difficult to detect specific ethnic differences in PSE attendance. For instance, they note that, in proportion to their percentage of the Canadian population, Chinese students are over-represented at universities and blacks are under-represented. For this reason, this variable may not be as valid a measure as those that identify specific ethnicities or ethnicities in combination with socio-economic status. If various ethnic groups are mixed like “apples and oranges,” any differences uncovered would not be due to cultural factors but most likely due to something they all share in common with each other in relation to the dominant ethnic group, such as discrimination. Future studies need to examine Canada’s ethnic groups in more detail, with sample sizes large enough to make comparisons among them.

Keeping this caveat in mind, we can make some observations regarding visible minority students. Previous research by Acumen (2003) revealed that visible minorities tend to have educational aspirations at the highest levels of PSE rather than at the lower levels of a Bachelor’s or teaching degree. This may be due to Canada’s immigration policy, which favours those with higher credentials (i.e., students’ parents), in addition to the fact that many families immigrate to Canada in hopes of their children becoming upwardly mobile.

Aboriginal students present a different picture and have experienced a sharp increase in PSE participation over the past two decades (Junor and Usher, 2004). However, there seem to be persistence problems associated with “personal factors” (Malatest and Associates, 2004), which are explainable in terms of our hypothesized perceptual horizon effect.

Based on the literature, we did not have firm expectations concerning how the ProI measures would differentiate visible minority students from the mainstream ethnic group.

**III.3.2 Key Findings**

Findings for those reporting visible minority status were not entirely consistent among the studies undertaken in this research program. In the sample of college- and university-bound students (FC2), those reporting a visible minority status were less sure about both the monetary and non-monetary benefits and more concerned about identity anxiety. They also showed greater indecision concerns on the RAPSE. However, in the Grade 12 sample (FC4), visible minority students perceived both greater benefits and greater costs associated with PSE. The overall ProI16 measure thus did not show differences, presumably because the perception of greater costs and perception of greater benefits cancelled each other out. On the RAPSE scale, visible minority students expressed lower levels of belief in PSE alternatives, yet experienced greater indecision concerns about PSE. Finally, in terms of ProI cluster, visible minorities were less likely to be pessimists about PSE and more likely to be skeptics, suggesting that they are indecisive, concerned about both forms of costs and lukewarm about benefits.

The perceptions recorded in the FC4 study did not translate into dramatic differences in the choices which had been made by young visible minority students at T2. Results reveal only that male visible minority students were more likely to have directly entered the workforce than were non-visible minorities. No differences were found in the other trajectories, although the small number reporting this status (n = 61) in the analysis may have reduced the likelihood of other differences reaching statistical significance.
Interestingly, the survey of the general population (FC3) found that while there were no significant effects for visible minority status at the bivariate level, there was an interaction effect with education, such that visible minorities with the lowest level of education actually had greater perceptions of the returns on PSE than did those with the highest level of education. These results suggest that PRoI in the general population of visible minority individuals, which is older and more experienced than the school-aged samples, is affected by the discrimination that may be experienced by visible minorities with high levels of education. This issue is currently quite prominent in the Canadian media—for example, in stories of gross underemployment of highly educated immigrants. Moreover, a narrow distribution of responses was observed among the most highly educated visible minorities, suggesting that there is a high degree of consensus among this group that a PSE is less beneficial for them.

Aboriginal students (in Grade 12, FC4) present a clear profile. These students scored lower on the PRoI16 than did those not reporting Aboriginal status. However, the lower score was because of higher scores on both costs subscales rather than differences on the benefits scales. This result is consistent with Malatest and Associates' (2004, p. 16) finding that “personal reasons” are more responsible for drop-out from university among Aboriginal youth than all other factors. In terms of the PRoI clusters, Aboriginal students (compared to the remainder of the sample) were less likely to be optimists and more likely to be skeptics about PSE benefits.

Upon follow-up after Grade 12, no differences in outcomes were observed for students reporting Aboriginal status, although the small number reporting this status (n = 31) in the analysis may have reduced the likelihood of differences reaching statistical significance.

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6. 7.5% of visible minority students also reported Aboriginal status. Only three respondents reported Aboriginal status in the FC2 sample and only 11 did so in the FC3 sample, so no statistical analyses were undertaken for those surveys.
Part IV.

Post-Secondary Trajectories

IV.1 Outcomes at T2

In the T2 follow-up of Grade 12 students, four outcomes were coded into the variable “T2outcome:”

- work/other (17.0%)
- remained in high school (36.4%)
- community college (17.0%)
- university (29.5%).

IV.1.1 The PRoI Profile

Table 7 shows the T2 sample means for each subscale of the PRoI Profile and the differences among T2outcome groups.

Several noteworthy patterns are evident in these results. First, those who selected college differ in many significant ways from those who went on to university. In fact, those in college appear to have more in common with those in high school. Only two scales show common ratings for college and university students (high non-monetary benefits and low indecision concerns), but seven of the nine scales reveal common ratings for high school and college students (especially in seeing the costs of PSE as relatively high and being middling in their estimates of PSE benefits). This pattern has implications for how the multivariate tests should be conducted and suggests that we may need to rethink the strategy of including college and university outcomes together in the PRoI item wording that asks respondents about their attitudes to “PSE.” In addition, these results suggest that many young people may see college as more of an extension of high school than is the case for university, perhaps because many students do not have to move to attend community college (and the intent of community college is, as the name suggests, to serve the local community).

The second pattern shows that those who opt out of the educational system are distinct in that they perceive relatively low benefits and high costs of PSE, along with having a stronger belief that PSE alternatives are viable for them.

Finally, those who opted for university were quite consistent in their Grade 12 PRoI attitudes that PSE benefits are high and costs are low, coupled with a low rating with respect to belief in PSE alternatives and a low level of indecision concerns.

<table>
<thead>
<tr>
<th>T2outcome</th>
<th>Independent measure</th>
<th>Sample mean (SD)</th>
<th>Work/other</th>
<th>High school</th>
<th>College</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PRoI 16</td>
<td>18.4 (7.5)</td>
<td>Lo (15.3)</td>
<td>Mid (17.0)</td>
<td>Mid (17.5)</td>
<td>Hi (20.7)</td>
</tr>
<tr>
<td></td>
<td>BENTOT</td>
<td>33.2 (4.8)</td>
<td>Lo (31.5)</td>
<td>Mid (33.1)</td>
<td>Mid (33.0)</td>
<td>Hi (34.2)</td>
</tr>
<tr>
<td></td>
<td>Monetary</td>
<td>17.3 (2.4)</td>
<td>Lo (16.6)</td>
<td>Mid (17.3)</td>
<td>Lo (17.1)</td>
<td>Hi (17.9)</td>
</tr>
<tr>
<td></td>
<td>Non-monetary</td>
<td>15.8 (2.9)</td>
<td>Lo (15.0)</td>
<td>Hi (15.8)</td>
<td>Hi (15.9)</td>
<td>Hi (16.4)</td>
</tr>
<tr>
<td></td>
<td>COSTTOT</td>
<td>15.3 (4.9)</td>
<td>Hi (16.3)</td>
<td>Hi (16.1)</td>
<td>Hi (15.8)</td>
<td>Lo (13.6)</td>
</tr>
<tr>
<td></td>
<td>Debt aversion</td>
<td>9.5 (3.3)</td>
<td>Hi (10.3)</td>
<td>Hi (9.8)</td>
<td>Hi (9.8)</td>
<td>Lo (8.5)</td>
</tr>
<tr>
<td></td>
<td>Identity anxiety</td>
<td>5.9 (2.5)</td>
<td>Hi (6.1)</td>
<td>Hi (6.3)</td>
<td>Hi (6.1)</td>
<td>Lo (5.1)</td>
</tr>
<tr>
<td></td>
<td>Belief in PSE alternatives</td>
<td>12.4 (3.3)</td>
<td>Hi (13.0)</td>
<td>Mid (12.6)</td>
<td>Mid (12.5)</td>
<td>Lo (11.9)</td>
</tr>
<tr>
<td></td>
<td>Indecision concerns</td>
<td>9.6 (4.0)</td>
<td>Mid (10.2)</td>
<td>Hi (11.3)</td>
<td>Lo (8.5)</td>
<td>Lo (7.7)</td>
</tr>
</tbody>
</table>

Listwise n = 667; all one-way ANOVAs are significant; groups sharing the same level designation (lo/mid/hi) are not significantly different on the Student-Newman-Keuls test.
IV.1.2 The PRoI Clusters

In addition to the PRoI Profile, it is instructive to examine results for the PRoI clusters. Table 8 shows the cross-tabulation between PRoI cluster and T2outcome. It can be seen that optimists were indeed significantly more likely to enrol in university and less likely to stay in high school. Of the 289 respondents classified as optimists according to their Grade 12 scores, 125 (43% vs. 30% for the overall sample) went directly to university, whereas only 73 remained in high school (25% vs. 36%); we can surmise that many of the latter group would be likely to enrol in university next year or shortly thereafter.

It can also be seen that the skeptics are less likely to enrol in university and more likely to remain in high school: 57% of skeptics stayed in high school, and only 12% went on to university. Because skeptics have high levels of indecision concerns, they may make a future decision to attend but likely only if their beliefs about the costs change. Thus, they should be less likely to eventually attend university than the optimists discussed above.

Interestingly, pessimists do not stand out in terms of having unexpected outcomes, so other factors may be affecting their motivations.

IV.2 Educational Involvement and Support for PSE

Several measures were used in the research program to represent the involvement of students in their education (i.e., academic achievement, denoted by grade point average (GPA); academic engagement, designated by the amount of time spent on studying outside of class) and support for undertaking PSE (i.e., support and encouragement from others; knowledge of funding opportunities).

Table 9 shows how the T2outcome groups differ on these measures. Of particular note is the uniqueness of those who enrolled in university in relation to those who elected to attend college. As with the ANOVA results for the PRoI, these results suggest that including college and university students together as a PSE “group” may be problematic.

<table>
<thead>
<tr>
<th>PRoI Cluster</th>
<th>Work/other</th>
<th>High school</th>
<th>College</th>
<th>University</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pessimists</td>
<td>Observed count 35</td>
<td>67</td>
<td>37</td>
<td>54</td>
<td>193</td>
</tr>
<tr>
<td></td>
<td>Expected count 32</td>
<td>71</td>
<td>32</td>
<td>58</td>
<td>193</td>
</tr>
<tr>
<td></td>
<td>Adjusted residual .8</td>
<td>-.7</td>
<td>1.2</td>
<td>-.8</td>
<td></td>
</tr>
<tr>
<td>Optimists</td>
<td>Observed count 41</td>
<td>73</td>
<td>50</td>
<td>125</td>
<td>289</td>
</tr>
<tr>
<td></td>
<td>Expected count 46</td>
<td>107</td>
<td>48</td>
<td>88</td>
<td>289</td>
</tr>
<tr>
<td></td>
<td>Adjusted residual -1.3</td>
<td>-5.4</td>
<td>.5</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>Skeptics</td>
<td>Observed count 33</td>
<td>106</td>
<td>23</td>
<td>23</td>
<td>185</td>
</tr>
<tr>
<td></td>
<td>Expected count 30</td>
<td>68</td>
<td>31</td>
<td>56</td>
<td>185</td>
</tr>
<tr>
<td></td>
<td>Adjusted residual .6</td>
<td>6.8</td>
<td>-1.8</td>
<td>-6.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Count 109</td>
<td>246</td>
<td>110</td>
<td>202</td>
<td>667</td>
</tr>
</tbody>
</table>

Adjusted residuals greater than 1.96 are considered statistically significant at the 5% level.
IV.2.1 Do Grades Matter?

Grades clearly make a difference in terms of who goes on to university, but they do not significantly distinguish among those who go to college, remain in high school, or elect to enter the work force or do something else. Those who went to university had on average a B+ (4.8 on the scale used), which is clearly higher than the average for those who went to college or who remained in high school (B- and C+, respectively).

IV.2.2 Does Academic Engagement Matter?

Those who went directly from Grade 12 to university were significantly more engaged in their studies, putting in slightly more hours per week in studying for their classes or doing assigned work. All groups were in the range of six to ten hours per week.

IV.2.3 Does Encouragement Matter?

Encouragement from others to undertake PSE had a more varied effect than the two measures mentioned above. Those who remained in high school or worked received the lowest encouragement, community college students received significantly more encouragement and university students received the most encouragement. The cause and effect of this finding is difficult to sort out. The correlation between encouragement and both grades and engagement is in the .2 to .3 range, but it is difficult to say from these data whether better grades and more engagement lead other people to give students greater encouragement because they interpret grades and effort as aptitude or whether encouragement (perhaps in earlier years) leads students to try harder and thus receive higher grades.

IV.2.4 Does Knowledge Matter?

As one might expect, university students had greater knowledge of funding opportunities. However, community college students did not, and one would expect that they would have researched these opportunities as much as university students. Again, the causal nature of this relationship is not clear from this data set, especially the possibility that greater knowledge of funding results in students tending toward university more than community college. The nature of this relationship warrants further investigation—to what extent does knowledge of funding opportunities direct students to think more seriously about attending university? And are those who are university-bound more likely to pick up information about these opportunities along the way?
Several logistic regression analyses were conducted on the T2outcome variable to address the second—and most important—research question: does the PRoI predict later PSE involvement, net of other structural and personal factors?

Logistic regression requires a dichotomous (binary) dependent variable; accordingly, the T2outcome variable was recoded into a dichotomous variable in two ways to represent PSE choices.

Given the pattern of the bivariate results observed above, where those attending university differ from the other three groups on most variables, it was deemed advisable to put university attendees in one category and consider them in relation to the other three groups, recoded into one category. In a second set of analyses, T2outcome was recoded with college and university attendees assigned to one category and high school attendees and youth who entered the workforce in the other category. Thus, two sets of models were analyzed: one in which university attendance was the focus of the dependent variable and another in which PSE attendance in general (i.e., college and university attendance) was the focus of the dependent variable. The tables from the regressions with university attendance as the dependent variable are available in Appendix I.

The odds ratio is perhaps the most interesting information provided by logistic regression, because it tells us how much each independent variable explains against a reference category, controlling for all other variables in the equation. The values of odds ratios can range from zero to infinity, but are centered on the value 1.0, which signifies no predictive power.

If an independent variable is dichotomous, the odds ratio tells us the odds of one group possessing the quality of the dependent variable in comparison to the other group. For example, if gender is coded as male = 0 and female = 1, an odds ratio of 1.5 would indicate that females are 50% more likely to possess the quality represented by the value of 1 in the dependent variable, which is also coded as 0 and 1 (e.g., attending university is coded as 1 and other outcomes coded as 0). In the case of a continuous variable, the odds ratio indicates the change in the odds of a certain percentage for each point on the scale. For example, an odds ratio of 1.05 indicates that the independent variable increases the likelihood of possessing the quality represented by the value of 1 in the dependent variable (e.g., attending university) by 5% for each point on the scale of the independent variable.

The following strategy was undertaken after examining various models and taking into account limitations of the data set (e.g., visible minority status is not significant in the regression analyses and has a skewed distribution because of the small number of cases, so it will not be included in the reported analysis). Logistical regression models were calculated using three blocks of variables:

- structural/background variables:
  - gender
  - first-generation university student status (for the first set of analyses) or first-generation any PSE status (for the second set of analyses)
educational experience variables
• grade attainment
• engagement in courses
• encouragement to pursue PSE
• knowledge of sources of funding
• the PRoI measures
• either PRoI16 or PROI cluster.

V.1 How Much of a Difference Do Perceptions Make? The PRoI in Action

V.1.1 Predicting University Attendance: The PRoI16

Tables 1a and 1b in Appendix I provide the model tests and summary, indicating the significance levels and estimates of variance explained (R²). Table 1c provides the classification table, which shows that the model can correctly classify 76% of cases in the dependent variable. It is of interest to note in this table that the model represented by these independent variables is better at predicting who will not attend university (85.3% correct predictions) than who will attend (58.2%), although the latter predictive accuracy is nevertheless useful. Table 1d shows the unique effects of independent variables and has most of the information of interest in evaluating the PRoI research program and the hypothesis that PRoI would remain a unique predictor of PSE attendance.

It is noteworthy that student engagement in courses is not significant. The fact that academic engagement does not uniquely predict university attendance when grades are taken into account corresponds with recent evidence of reduced engagement among both secondary and university students in conjunction with grade inflation, rendering the obtained grade all-important in determining academic trajectories (e.g., Côté and Allahar, 2007; National Survey of Student Engagement, 2004).

All other independent variables remain as significant unique predictors. Females are over 50% (odds ratio = 1.545) more likely to attend than males, and first-generation university students are about half as likely to attend (.517) than those who had a parent who attended university. Grades are very important, with the odds of attending university increasing by 233% between C average students and B average students and again between A and B average students. Receiving encouragement from others remains a unique predictor, with the odds of attending increasing by 13% with every point on this scale. In addition, knowledge of funding opportunities increases the likelihood of attending by 7% for each point on this scale. And, finally, the PRoI16 remains a significant predictor when controlling for all of these other factors, with the odds of attending increasing by 4% (odds ratio = 1.042) with every point on this scale.

Although not shown in one of the tables, when the two components of the PRoI16 (BENTOT and COSTTOT) are substituted for the PRoI16 in the analysis, it is only COSTTOT that remains significant and the odds ratio indicates that someone is about 7% less likely to attend university with every point on that scale. When only identity anxiety is entered into the analysis, it is significant with an odds ratio of .867, indicating that the likelihood of attending decreases by 13% with every point on that scale. Interestingly, gender loses its significance with identity anxiety in the model, presumably because identity anxiety seems to be more of a “male problem.”

This first multivariate analysis thus confirms the hypothesis driving the research program—namely, that the Perceived Return on Investment from PSE is a significant predictor of actual behaviour, net of other important factors. Several other multivariate analyses were undertaken to better understand the nature of this relationship and the relationship of these other important factors, as discussed next.

V.1.2 Predicting University Attendance: PRoI Cluster

It was expected that optimists would be more likely to undertake a university education than pessimists or skeptics. The above logistic regression analysis was repeated with PRoI cluster substituted for PRoI16 as the last step in the model. This was done because the
PRoI cluster contains unique information culled from all PRoI subscales and the ancillary RAPSE scales.

As a three-category variable, one category had to be designated for cluster analysis as the reference category for PRoI cluster. At the same time, the “difference contrast method” is used in cluster analysis procedures when categorical variables are used, so each successive category is compared with the average effect of all of the preceding categories. Thus, while “pessimists” were selected as this reference category (because the bivariate analyses suggest that this category has the least association with variations in PSE outcomes), they are only the reference category for the second group (optimists); in turn, the third group (skeptics) is compared to both previous groups together (pessimists and optimists).

The results reported in Tables 2a through 2d of Appendix I are similar to those reported for the PRoI16. The ability to correctly classify cases improved somewhat, but the odds ratios stayed much the same. Results for the PRoI cluster indicate that optimists were almost 50% more likely to attend university than pessimists (although the Wald statistic was not significant), and skeptics were about 75% less likely to attend than optimists and pessimists combined. Thus, the PRoI subscales formed into clusters also provide predictive potential, per the hypothesis driving this research program.

V.1.3 Predicting PSE Attendance in General

The logistic regression analyses that combined college and university students into one group did not find the PRoI16 to be a significant predictor of attendance; these results are not presented in tables because of the lack of significance. This result was anticipated from the results of the bivariate tests reported above, where those who went to college did not differ from those who stayed in high school on seven of the nine PRoI and RAPSE scales. For example, both continuing high school and college students had similar ratings in seeing the costs of a PSE as relatively high and were middling in their estimates of PSE benefits. College and university students only had similar ratings in terms of giving high ratings to non-monetary benefits and low ratings to indecision concerns.

Despite this limitation, the overall model in which the PRoI16 was used is significant and useful. It shows that females are about 67% more likely to undertake a general PSE than males and that grades remain important (but with about one half the impact of the analyses involving university attendance only). In addition, it remains important for others to encourage students to undertake a PSE (19% increase in odds with every point on this scale). However, knowledge of scholarships does not significantly predict PSE attendance.

When the PRoI cluster was substituted for the PRoI16 in the regression equation, the cluster variable did significantly predict general PSE attendance. Although it was expected that optimists would be the most likely to attend among the three clusters, they were not significantly more likely to do so than were pessimists, according to the Wald test; the odds ratio indicates they are 20% more likely to attend. In accordance with the expectation that skeptics would be hesitant to undertake any PSE, they stand out as 75% less likely to participate in PSE than optimists and pessimists combined.
VI.1 Intervention Potential

This research program evaluating the PRoI concept and measurement strongly suggests that the disadvantaged sectors of the youth population possess attitude structures that involve considerable deliberation about and higher estimates of the various costs that PSE might incur. The ability to also recognize the benefits of PSE does not seem to be a major problem for most of these young people, given the relatively high ratings on these scales in most subpopulations (except for males, in general). In fact, of the six subscales of the PRoI Profile, monetary and non-monetary benefits consistently receive the highest ratings. However, personal and perceptual calculations of costs accompany financial concerns in most cases, which suggests that any interventions will need to do more than offer to reduce financial costs if more people from under-represented groups are to be enticed to participate in PSE.

The fact that the PRoI has predictive potential in terms of who will attend university means that it can be used in evaluating intervention programs. For example, the mean score on the PRoI for those attending university was approximately 21 on a scale that ranges from -8 to +32. Given that the logistic regression suggests that a person is 4% more likely to attend with each additional point on a scale, intervention efforts could take baseline measures on the PRoI and target the sample in terms of how much information and coaching is needed to raise scores to the point where they are more likely to attend. The targets of these interventions could be higher-achieving students (i.e., those earning Bs and As) from under-represented groups, such as first-generation students, visible minorities, Aboriginal students and males. At the very least, baseline measures could help those overseeing intervention programs recognize who can be reached and how much effort it might take to alter their perceptions of returns on investments from higher education.

“Does knowledge matter?” is a question that has been frequently asked recently, especially by the Foundation (2005). Based on the results of this research program, the answer is a resounding “yes.” The earlier studies showed that many young people misperceive the costs and benefits of PSE by overestimating costs and underestimating benefits. Information programs need to be established to correct these misperceptions, and these need to be directed at all high school students with the potential to move into PSE (in the case of university, those with grades in the range of A to B), especially in the earlier years of high school. These programs need to be especially sensitive in identifying first-generation PSE students with academic potential that may not be evident in their academic record.

VI.2 Policy Implications

With respect to what policy makers might take from these findings about encouraging disadvantaged groups to attend in greater numbers, it emerges that simply reducing financial costs and promoting the benefits of PSE will not be sufficient. Other issues are more important for some young people, especially those whom we have identified as pessimists and skeptics. Interventions will therefore need to be of a more personal nature, making those in these groups feel more at home in PSE institutions and helping them undergo an identity formation that includes images of themselves as people who deserve a higher education and can succeed without alienating others around them. In other words, the “perceived horizon effect” needs to be addressed among these students, by encouraging them to think more highly of themselves in terms of academic performance and to look beyond an immediate horizon that does not involve PSE. The “identity anxiety” scale (non-monetary costs) would be a suitable scale with which to begin monitoring these efforts, although attention should be directed at identifying any potential multi-dimensionality of the identity-anxiety construct.
VI.3 Future Research

With the ability to measure levels of PRI demonstrated, we can now examine more of its correlates as a step toward better understanding how to effectively increase accessibility for the most qualified and interested students, especially among those from backgrounds where PSE participation is historically low. We have shown in this research program that PRI levels vary as a function of ethnicity, gender and parental education. Future research can investigate this further, especially the questions of which ethnic groups are most “at risk” (by oversampling these groups to make it possible to conduct multivariate analyses on them) and whether males are to be considered an “at risk” group in the same way that females were two decades ago. In addition, with the benchmarks and norms established in the research program, we can observe trends over time, which will help us understand the impact of various economic and educational policies on PRI.

The PRI instruments can also be used in studies assessing the extent to which realistic and informed planning can pay off in terms of greater long-term returns on investment on a person-by-person basis. That is, longitudinal research can track students from high school through PSE and into the labour market to more precisely document the relationship between rational planning and eventual long-term, later-life benefits. Special programs need to be developed to address the problems associated with the restricted perceived horizon effect early in high school (e.g., first-generation Grade 10 students), at a point in time when those with identity anxiety have a chance to alter their identity formation and develop more positive academic self-concepts. We could thus examine whether changes in levels of awareness associated with student loans and scholarships influence an individual’s or a population’s level of PRI. In effect, we have a tool to help us assess the impact of programs and services aimed at promoting greater PSE participation (cf. Institute for Higher Education Policy, 2003).

In addition, realistic and informed planning may also be related to better student engagement in learning activities while enrolled in PSE. Paradoxically, the National Survey of Student Engagement shows that student disengagement is increasing, in spite of the increasing importance of academic achievement (e.g., Kuh 2001). In 2004 and 2006, Canadian universities participated in this survey, and the results show that Canadian universities performed more poorly than the U.S. national average on all indicators (Mayne 2005). Results from the PRI research program show that those who score highly on PRI are also more engaged academically while in high school, which means that they need to remain so in order to protect their investment. These PRI instruments are of potential use in addressing the student disengagement problem, in the form of information programs that educate students concerning the personal and financial costs of disengagement and the direct benefits of full academic engagement.

Finally, the PRI16 and its ancillary measures, RAPSE, have proven themselves to be powerful instruments in explaining differing experiences among high school students and those from the general population, as well as mapping differing experiences among subgroups. These instruments provide profiles with which we can understand the ways students and those in the general public—and subgroups among them—perceive the relative merits of a PSE. With this information, we have been able to predict with some precision who will actually attend.

It appears, however, that community college students and university students differ on a number of important points. In the future, the precision of the PRI instrument may be increased if different versions are used for different sectors of the post-secondary system (e.g., a special version for those applying specifically to community colleges). Our initial testing in FC2 showed that most people have a good sense of the differences in the monetary benefits and costs of college versus university, so asking them to equate the two in one question likely leads to unnecessary errors. It is also the case that community colleges
differ across Canada depending on the province, with some provinces providing community colleges that have more in common with universities than is the case in other provinces. Any change in the instrumentation should take this into account if studies are undertaken on a national scale. Finally, future research efforts need to look at how various groups conceptualize the non-monetary benefits of PSE and perhaps new items are needed that are less correlated with monetary benefits.
References


Human Resources Development Canada. 2000. *Profile of Canadian Youth in the Labour Market*. Hull, Quebec: HRDC.


Mayne, P. “Poor Results Blamed on Too Few Resources.” Western News, March 24, 2005: p. 3.


Two sets of models were analyzed: one in which university attendance is the focus of the dependent variable (university attendance = 1; the other three categories = 0) and one in which PSE attendance is the focus of the dependent variable (college and university attendance = 1; work/other and high school = 0).

The independent variables were coded as follows:

- **structural/background variables**
  - GENDER (male = 0; female = 1)
  - FSTGENU1 (at least one parent has some university = 0; neither parent has any university experience = 1 — when the dependent variable is university attendance) or FIRSTGEN (at least one parent has some college or university = 0; neither parent has any college or university experience = 1 — when the dependent variable is college or university attendance)

- **educational experience variables**
  - GPAR (C or less = 0; B = 1; A/A+ = 2)
  - ENGAGER1 (5 hours or less = 0; 6–10 hours = 1; 11+ hours = 2)
  - ENCOU (range = 8–28)
  - KNOWSCHO (range =0–28)

- **the PROI measures**
  - either PROI16 (range = -8 to +32) or PROI cluster (pessimists = reference category).

Four tables accompany each logistic regression analysis, providing information about: (1) significance levels of the model tested, (2) estimates of variance explained ($R^2$), (3) accuracy of the independent variable in classifying the dependent variable and (4) the unique effects of each independent variable, along with significance levels and odds ratios.

Four sets of logistic regressions were discussed in the body of this report to give a sense of the differences between using university attendance only as a dependent variable (two regressions) and college or university (i.e., any PSE) as an independent variable (two regressions). For each of these dependent variables, separate regressions were run with PROI16 as an independent variable and PROI cluster as an independent variable. However, tables are provided for only those regressions using university attendance as a dependent variable, because of the poorer predictive power of “any PSE” as a dependent variable.
**ProI6 Analysis**

**Table 1a — Omnibus Tests of Model Coefficients**

<table>
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<tr>
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<th>Chi-square</th>
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</thead>
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<tr>
<td>Block</td>
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**Table 1b — Model Summary**

<table>
<thead>
<tr>
<th>-2 Log likelihood</th>
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<th>Nagelkerke R Square</th>
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<td>558.906</td>
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**Table 1c — Classification Table**

<table>
<thead>
<tr>
<th>Observed</th>
<th>T2outcome: university vs. all</th>
<th>Percentage correctly classified</th>
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</thead>
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<td>University</td>
</tr>
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**Table 1d — Variables in the Equation**

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<th>Wald</th>
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<th>Sig.</th>
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PROI Cluster Analysis

Table 2a — Omnibus Tests of Model Coefficients

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Table 2b — Model Summary

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<th>Nagelkerke R Square</th>
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<tbody>
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Table 2c — Classification Table

<table>
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<th>Percentage correctly classified</th>
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<td>University</td>
</tr>
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<td>53</td>
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<tr>
<td>Non-university</td>
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<td>80</td>
<td>103</td>
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<tr>
<td>University</td>
<td></td>
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</tbody>
</table>

Overall percentage correctly classified

Table 2d — Variables in the Equation

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
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<tbody>
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